

Claims

1. An emulsified water-blended fuel composition comprising:

(A) a hydrocarbon boiling in the gasoline or diesel range:

(B) water;

(C) a minor emulsifying amount of at least one fuel-soluble carboxylic salt made by reacting (C)(I) at least one acylating agent having about 16 to about 500 carbon atoms with (C)(II) ammonia and/or at least one amine; and

(D) a minor emulsion stabilizing amount in the range of about 0.001 to about 15% by the weight of said water-blended fuel composition of a water-soluble amine salt represented by the formula



wherein in formula (D-I), G is hydrogen, or an organic neutral radical of 1 to about 8 carbon atoms having a valence of y; each R independently is hydrogen or a hydrocarbyl group of 1 to about 10 carbon atoms; X^{p-} is an anion having a valence of p; and k, y, n, and p are independently at least 1, provided that when G is H, y is 1; further provided that either G or at least one R is hydrogen; and further provided that the sum of the positive charge ky^+ is equal to the sum of the negative charge np^- such that the amine salt (D) is electrically neutral.

2. The composition of claim 1 wherein the acylating agent (C)(I) is at least one monocarboxylic acid or a reactive equivalent thereof.

3. The composition of claim 2 wherein the monocarboxylic acid has about 16 to about 30 carbon atoms.

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4. The composition of claim 1 wherein the acylating agent (C)(I) is palmitic acid, stearic acid, linoleic acid, arachidic acid, gadoleic acid, behenic acid, erucic acid, ligonceric acid and mixtures of two or more thereof.

5. The composition of claim 1 wherein the acylating agent (C)(I) is at least one polycarboxylic acid or a reactive equivalent thereof.

6. The composition of claim 1 wherein the acylating agent (C)(I) is at least one hydrocarbyl-substituted succinic acid or anhydride.

7. The composition of claim 6 wherein the hydrocarbyl substituent of the hydrocarbyl-substituted succinic acid or anhydride is a polyisobutene group.

8. The composition of claim 7 wherein the polyisobutene group has an average of about 35 to about 400 carbon atoms.

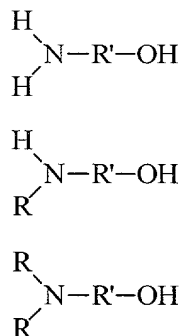
9. The composition of claim 1 wherein the acylating agent (C)(I) is hexadecenyl succinic acid or anhydride.

10. The composition of claim 1 wherein the acylating agent (C)(I) is at least one hydrocarbyl-substituted succinic acid or anhydride comprising at least one hydrocarbyl substituent and at least one succinic group wherein the hydrocarbyl substituent is derived from an olefin polymer, the acylating agent being characterized by the presence within its structure of an average of at least 1.3 succinic groups for each equivalent weight of the hydrocarbyl substituent.

11. The composition of claim 1 wherein the amine (C)(II) is a monoamine, a polyamine or a hydroxyamine.

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12. The composition of claim 1, wherein the amine (C)(II) is selected from the group consisting of primary, secondary and tertiary alkanolamines represented correspondingly by the formulae



and mixtures of two or more thereof; wherein in the above formulae each R is independently a hydrocarbyl group of one to about 8 carbon atoms, and each R' is independently a hydrocarbylene group of about 2 to about 18 carbon atoms.

13. The composition of claim 1 wherein (D) is ammonium nitrate, methylammonium nitrate, urea nitrate, urea dinitrate, or a mixture of two or more thereof.

14. The composition of claim 1 wherein the composition further comprises (E) an emulsifying amount of at least one cosurfactant distinct from (C) having a hydrophilic lipophilic balance in the range of about 2 to about 10.

15. The composition of claim 1 wherein the composition further comprises (F) at least one organic nitrate cetane improver.

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16. The composition of claim 15 wherein (F) is 2-ethylhexyl nitrate.

17. The composition of claim 1 wherein the composition further comprises (G) at least one antifreeze agent.

18. An emulsified water-blended fuel composition comprising:

(A) a hydrocarbon boiling in the diesel range:

(B) water;

(C) a minor emulsifying amount of at least one fuel-soluble salt made by reacting (C)(I) at least one monocarboxylic acid having about 16 to about 30 carbon atoms with (C)(II) at least one hydroxyamine amine; and

(D) a minor emulsion stabilizing amount in the range of about 0.001 to about 15% by the weight of said water-blended fuel composition of a water-soluble amine salt represented by the formula



wherein in formula (D-I), G is hydrogen, or an organic neutral radical of 1 to about 8 carbon atoms having a valence of y; each R independently is hydrogen or a hydrocarbyl group of 1 to about 10 carbon atoms; X^{p-} is an anion having a valence of p; and k, y, n, and p are independently at least 1, provided that when G is H, y is 1; further provided that either G or at least one R is hydrogen; and further provided that the sum of the positive charge ky^+ is equal to the sum of the negative charge np^- such that the amine salt (D) is electrically neutral.

19. An emulsified water-blended fuel composition comprising:

(A) a hydrocarbon boiling in the diesel range:

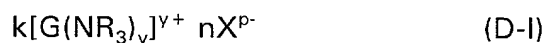
(B) water;

(C) a minor emulsifying amount of at least one fuel-soluble salt made by reacting (C)(I) at least one polyisobutene substituted succinic acid or

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anhydride having about 16 to about 500 carbon atoms with (C)(II) at least one hydroxyamine amine; and

(D) a minor emulsion stabilizing amount in the range of about 0.001 to about 15% by the weight of said water-blended fuel composition of a water-soluble amine salt represented by the formula



wherein in formula (D-I), G is hydrogen, or an organic neutral radical of 1 to about 8 carbon atoms having a valence of y; each R independently is hydrogen or a hydrocarbyl group of 1 to about 10 carbon atoms; X^{p-} is an anion having a valence of p; and k, y, n, and p are independently at least 1, provided that when G is H, y is 1; further provided that either G or at least one R is hydrogen; and further provided that the sum of the positive charge ky^+ is equal to the sum of the negative charge np^- such that the amine salt (D) is electrically neutral.

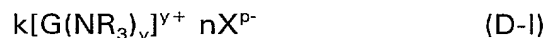
20. An emulsified water-blended fuel composition comprising:

(A) a hydrocarbon boiling in the diesel range:

(B) water;

(C) a minor emulsifying amount of a mixture of: at least one fuel-soluble salt made by reacting at least one monocarboxylic acid having about 16 to about 30 carbon atoms with at least one hydroxyamine amine; and at least one fuel-soluble salt made by reacting at least one polyisobutene substituted succinic acid or anhydride having about 16 to about 500 carbon atoms with at least one hydroxyamine amine; and

(D) a minor emulsion stabilizing amount in the range of about 0.001 to about 15% by the weight of said water-blended fuel composition of a water-soluble amine salt represented by the formula



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wherein in formula (D-I), G is hydrogen, or an organic neutral radical of 1 to about 8 carbon atoms having a valence of y; each R independently is hydrogen or a hydrocarbyl group of 1 to about 10 carbon atoms; X^{p-} is an anion having a valence of p; and k, y, n, and p are independently at least 1, provided that when G is H, y is 1; further provided that either G or at least one R is hydrogen; and further provided that the sum of the positive charge ky^+ is equal to the sum of the negative charge np^- such that the amine salt (D) is electrically neutral.